

Recorded from Trenton Falls, New York, and St. Martin's Falls, Albany River, Hudson's Bay.

4. *Limnophilus*, sp.

Carberry, Aug. 4, 1892.

ORTHOPTERA.

1. *Arphia sulphurea*.

*Gryllus sulphureus*, Fabr. Spec. Ins. i. p. 369. n. 39 (1781).

Carberry, Aug. 4, 1892.

A common North-American species.

2. *Stenobothrus*, sp.

Carberry, July 11 and Aug. 4, 1892.

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III.—*The Morphology of the Generative System in the Genus Testacella.* By WALTER E. COLLINGE, Demonstrator of Biology, Mason College, Birmingham.

[Plate I.]

CONSIDERING how plentiful and widely distributed the three British species of this genus are, and the interesting relations that exist between the *Testacelle* and a number of genera not found in Great Britain, it is somewhat surprising to find that they have received so little attention from malacologists in this country.

One of the most valuable and important works upon the European slugs is that by Dr. Simroth \*, published in 1886, in which he drew attention to the importance of the generative and alimentary systems as a basis for classification; and, although I think it very desirable when describing new species of slugs to fully describe the general anatomy of the same, this valuable monograph has been the means of placing the study of the slugs upon a more rational basis than it has hitherto occupied, and has given students a ready means of distinguishing one species from another by the morphology of the reproductive organs.

Dr. Scharff, in his admirable account of the Irish slugs †,

\* Zeitschr. f. wiss. Zool. 1885, vol. xlii. pp. 203-366, 5 pls.

† Trans. Roy. Dublin Soc. 1891, vol. iv. ser. 2, pp. 513-562, 2 pls.

has figured and described the generative system of most of the slugs found in this country, and I have more recently described \* the same system in a number of *Arions* not found in Ireland or not known as occurring in the British Isles at the time Dr. Scharff wrote. A similar description, with figures of the *Testacellæ*, is, I think, desirable.

My best thanks are due to Mr. J. G. C. Taunton, of Mason College, for the abundance of material which he has been good enough to procure for me, and also to Messrs. Morris Young, E. W. Swanton, and Charles Oldham for specimens which they from time to time have favoured me with.

*Testacella haliotidea*, Drap. (Pl. I. figs. 1 and 4.)

It will be unnecessary to dwell at any length upon the system in more than one species, as it is one of comparative simplicity. I shall therefore describe in detail the individual organs in this species, and point out in the two following ones the various differences and modifications, and then briefly compare the three.

The vestibule opens into a dilated vagina, from which the receptacular duct is given off. At the point of juncture of the vestibule and vagina the penis passes off; it is a long curved organ, the anterior portion of which is sometimes dilated in a somewhat cæcal-like form, as shown in Pl. I. fig. 4. This must not be regarded as the typical form of the penis. I would specially draw attention to this fact, as it has been figured and described as such † and certain comparisons instituted between the form of the organ in *T. haliotidea* and *T. scutulium*. A reference to Lacaze-Duthiers's well-known paper and accurate figures ‡ supports my statement. The direct continuation of the penis is the vas deferens; from the point of juncture of the two organs a long dilated flagellum is given off laterally. In the paper just cited Mr. J. W. Taylor very wrongly describes the vas deferens as passing off laterally from the penis and flagellum, whereas, as previously stated, the vas deferens is a direct continuation of the penis. In none of the European *Testacellæ* which I have examined does the vas deferens differ in its relation to the penis from the same organ in any other slug; that is to say, although it may externally appear to pass off from the penis as a lateral tube, morphologically it is

\* 'Conchologist,' 1892, vol. ii. pp. 56-66 and 76-83; also 1893, vol. ii. pp. 113-117.

† Journ. Conch. 1888, pp. 337-347.

‡ Arch. de Zool. exp. et gén. 1887, vol. v. pp. 459-596, 12 pls.

the direct continuation of that organ. The receptacular duct arises from the most anterior portion of the vagina; it is a fairly wide tube, which opens into a dilated and slightly oval-shaped sac, the receptaculum seminis. The vagina in the majority of the *Testacellidæ* is of great length. This feature is more marked in *T. scutulium* and *T. Maugei* than in this species. It is continued as the oviduct and prostate—the common duct of many authors. There is a large albumen-gland present, which calls for no special mention. The hermaphrodite duct is a densely convoluted canal leading from the hermaphrodite gland, which is usually of an oval form.

*Testacella scutulium*, Sowerby. (Pl. I. fig. 2.)

This species has been classed as a variety of *T. haliotideæ* by most of the writers upon the British Mollusca.

It was described and figured by Sowerby in 1823, in his 'Genera of Recent and Fossil Shells.' Férussac, who in the same year examined specimens, came to the conclusion that it was but *T. haliotideæ*, with which view Mr. Sowerby agreed, and since then it has been regarded as a variety of that species by Gray, Forbes and Hanley, Jeffreys, Rimmer, and other authors. It was redescribed as a new species by Mr. Tapping in 1856, as *Testacella Medii-Templi*. In 1886 Mr. Charles Ashford made anatomical examinations of the slug and clearly proved its specific distinctness. An account of his work is embodied in a paper previously referred to (Journ. Conch. 1888). Although to Mr. Ashford is due the credit of having placed this slug in its proper position, the above-mentioned account, both description and figures, leaves much to be desired.

The distinctness between vestibule and vagina is scarcely perceptible in this species. The upper part of the vagina is dilated in a pouch-like manner, but narrows previous to entering the oviduct. The penis is a large muscular organ and readily distinguishable from that in the preceding species, being rather shorter and always much broader. It opens into the vas deferens. There is no flagellum. The penial retractor muscle is attached laterally to the penis. The receptacular duct leaves the vagina as a broad pouch-like organ, and continues as such for quite two thirds of its length, when it tapers off suddenly into a narrow and short tube, which opens into the small globular receptaculum seminis. Judging from the peculiar form of the receptacular duct and the internal structure, I think it is very probable that the ova

are fertilized in this broad pouch-like portion. The hermaphrodite gland is slightly larger than in *T. haliotidea* and the duct longer.

*Testacella Maugei*, Fér. (Pl. I. fig. 3.)

In this species the vestibule and vagina are rather easier to distinguish than in the preceding one. At the junction of the two organs the penis passes off; it commences as a narrow tube, and then broadens out into an expanded head. It is much longer than in *T. scutulum*. The vas deferens previous to entering the prostate is thrown into a series of convolutions; these were characteristic of all the specimens dissected and quite unlike anything I have previously seen in this organ. The receptacular duct commences as an ovoid dilatation from the vagina, and is continued as a long narrow tube, which enters the receptaculum seminis laterally, reminding one somewhat of the condition in *Arion fasciatus*, Nils., only the shape here is oval, and not tapering and pointed as in that species. The oviduct and prostate are sharply folded upon each other, a character fairly constant. The hermaphrodite gland is somewhat triangular in shape and readily distinguishable from that organ in either of the two preceding species.

*Variation.*

Although a large number of specimens of each species have been dissected, the amount of variation noted in any individual species was very slight and unimportant.

In *T. haliotidea* the flagellum exhibits a series of minor variations, being either a straight tapering tube with the distal portion sometimes dilated, or it forms a dilatation at an angle to the general body, not unlike the head of a golf-stick. I have already referred to the variation in the form of the penis (Pl. I. fig. 4).

In *T. scutulum* the penal retractor muscle often exhibited a division into two portions, while in others there was a small retractor muscle given off below the ordinary one.

*Summary.*

There are certain resemblances in the form of the generative organs in *T. scutulum* which connect it with *T. Maugei*, such as:—

- a. The dilatation of the proximal portion of the receptacular duct.

- b. The absence of a flagellum.
- c. The form of the penis and vas deferens.

There are few anatomical points which connect either of the above species with *T. haliotideae*, and there are no grounds whatever for retaining *T. scutulium* as a variety of *T. haliotideae*.

The generative systems of *T. bisulcata*, Risso, and *T. Pecchiolii*, Bourg.\*, have been compared with those of all the above three species, and they agree very closely with *T. scutulium*, of which both are probably varieties; but a further investigation of their general anatomy is desirable before finally classing them as such.

#### EXPLANATION OF PLATE I.

- Fig. 1. *Testacella haliotideae*, Drap.
- Fig. 2. *Testacella scutulium*, Sowerby.
- Fig. 3. *Testacella Mauvei*, Fér.
- Fig. 4. *Testacella haliotideae*, Drap. Variation in the form of the penis.

<i>alb.g.</i> Albumen gland.	<i>p.r.m.</i> Penal retractor muscle.
<i>fl.</i> Flagellum.	<i>r.d.</i> Receptacular duct.
<i>h.d.</i> Hermaphrodite duct.	<i>r.s.</i> Receptaculum seminis.
<i>h.g.</i> Hermaphrodite gland.	<i>v.</i> Vestibule.
<i>ov.</i> Oviduct.	<i>v.d.</i> Vas deferens.
<i>p.</i> Penis.	<i>vg.</i> Vagina.
<i>pr.</i> Prostate.	

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#### IV.—On the Names or Existence of three Exotic Starfishes. By F. JEFFREY BELL, M.A.

I HOPE the following notes will be found to be of some assistance in the systematic nomenclature of Asteroidea.

“*Asterina marginata* (Val.), Perrier.”

The species referred to thus in the ‘Challenger’ Report of Asteroidea should be called *A. stellifer*, Möbius. So far as Valenciennes is concerned he only wrote a manuscript label for the Museum in the Jardin des Plantes. Hupé, in 1857, printed the name in vol. iii. (Mollusques) p. 100 of the Exp. de l’Amér. du Sud, but it is a *nomen nudum*. In 1859 Möbius, in the Abh. Geb. Naturw. Hamburg, iv. 2, p. 4, described *Asteriscus stellifer*, and, in 1860, Lütken (Vid.

\* Boll. Mus. Zool. Torino, 1888, vol. iii. no. 43, pp. 1-10, 1 pl.